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Analyzing Visual Sentiment in Photojournalism

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Artificial Intelligence for the Humanities

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Abstract

Like any other branch of journalism, a photojournalist's intent is to capture an image that conveys the the events represented in the image while evoking an emotional response that allows the viewer to connect with the content of the photo or news report to which the photo is attached. Under the umbrella of photojournalism, political photography is unique in that it is heavily swayed by public opinion. This project intends to introduce a duel perspective on visual sentiment in political photojournalism.

Introduction

When covering a political event, photojournalists are actively working to capture movement, gestures, lighting, and depth order to suggest how the viewer should feel about a particular person or event. Harsh or soft lighting, depth of field, the angle that the photo is taken: these are all aspects of photography that can drastically change the way a viewer feels about the person being photographed, also known as the subject. Previous generations of photojournalists always considered content over style or form.[1] However, the newest generation is has come to understand the power of perception and the ability that their cameras have to shape it. "Gibson's theory of object perception (Gibson, 1979), holds that people's faces provide adaptive information about the social interactions they afford," in politics this is a sociological concept that has come to define the political game. [2] Political scientists, while aware of the importance of visual data, have, until recently, avoided analyzing visual data due to the cost and time required to analyze it.[3] However, with deep learning tools like Convolutional Neural Networks the ability to analyze such data opens new doors for both photojournalists and political scientists.

Convolutional Neural Network (CNN)

A CNN is a type of neural network that consists of a convolutional layer, a pooling layer and a fully connected layer, with several hidden layers in-between. [4] The because CNNs are capable of recognizing spacial values in the data, it makes them perfect for processing images. The input layer is the image that goes through a process of feature mapping. What makes the convolutional layer so important is that as it moves over an image, it is able to map out features and because it exist as a part of a neural network it is able run hundreds of epochs of thousands of images at a time. This amount of processing ability allows the CNN to learn how to categorize images.

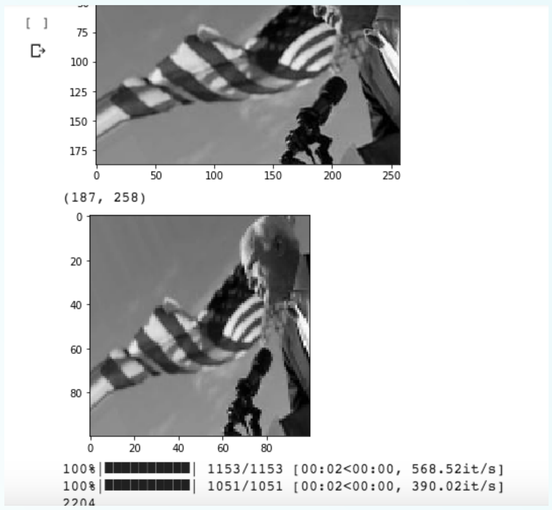
Motivating Question

Ever since photography became a common method of communication, the old adage "a picture is worth a thousand words" has been considered common knowledge. However, in the age of technology, it is important to analyze why and how an image coveys the information that it does. In a political sense, it is important to ask how a single image could sway a vote?

Methodology

Before creating a CNN it is important to decide what subject to train the CNN on. In this case, John McCain serves as a perfect example of a polarizing political figure who has been both praised and shamed by the media over the years.
In order to Create a CNN that can learn to detect that an image has a image with a positive sentiment or a negative sentiment, it had to be trained on a data set that consisted of two categories: in this case, positive and negative. For this dataset, one-hundred images of John McCain that would be considered a positive image and one- hundred images that would be considered negative: this is the training dataset that will teach the CNN. In order to achieve this, the images were downloaded from Google Images using a targeted search to a directory and saved into subdirectories as the categories "positive" or "negative". However, in order to train a CNN there needs to be enough data for the CNN to learn from and two-hundred total images is not enough. In order to generate more training data each of the images is run through image preprocessing.

Image preprocessing is a method of slightly augmenting the images and saving the new image files to a new directory that that holds the new images. In this case, I used ImageDataGenorator (), a class that runs through the keras library in Python. After running the original two-hundred images through preprocessing there was a total of 1400 images in the training dataset for the CNN to learn from. In (figure 1), one of the training images has gone through preprocessing and below it is one of the transformed images that comes out of the process to be added to the dataset.



After the images are finished processing they are resized, converted into black and white in order to make sure that the images are uniform. If there are unintentional discrepancies in the data the CNN will learn to single out the images that just so happen to be a different size. The next step is to create an array that will allow the convolutional layer to work over the images in a grid patter looking for particular features. Once the neural network is setup, the program runs through the training data. In (figure 2) the results of the CNN suggest that there is something wrong with the training set as the CNN is only correct about 60% of the time.

```
mple - loss: 0.5811 - acc: 0.6958 - val_loss: 0.6725 - val_acc: 0.6103
mple - loss: 0.5350 - acc: 0.7354 - val_loss: 0.6937 - val_acc: 0.6042
mple - loss: 0.4775 - acc: 0.7691 - val_loss: 0.7662 - val_acc: 0.6042
mple - loss: 0.4499 - acc: 0.7905 - val_loss: 0.7346 - val_acc: 0.6193
```

Implications

The relationship between photojournalism and political science and sociology is changing very quickly. Much of the speed of this change is due in part to the speed and development of data technology. For politicians like John McCain, image and perception are just as important as ones voting record in the House or Senate. Being recognizable to the public is important: being likable, being the man/woman-next-door, being able to appear as a friend while being a complete stranger. Been able to recognize what visual cues or tricks that allow a sense of familiarity is half of a political campaign. According to the "familiar face overgeneralization (FFO) hypothesis that the utility of differentiating known individuals from strangers has produced a tendency for responses to strangers to vary as a function of their resemblance to known individuals." [2]Being able to recognize the images that allow a candidate to know exactly what images give this impression could be an important advantage in the long run. However, it is also a lot of power to give a politician or a photojournalist. For those who work in the press, it is a fine line to walk between wanting to have creative freedom over one's work and the political class that has a specific image to maintain.[6] With print journalism on the way out, digital images that are some easily manipulated seem to mimic the changing political world. Just as "print journalism was one way of representing the social world, and the liberal democracy was one way of organizing society. Each may have lead on the other more than had been hoped" (23). [4]

Future CorrectionsImplications

There were two main issues with the data for this project. Firstly, the dataset for this project was rather small to train a complete CNN. When mining the data from Google Images a large number of files were removed in the data cleaning process. Duplicate images as well as imprecise search terms my have made it more difficult to find a large dataset. Secondly, then training the CNN the number of pixels were cut to 100x100 in order to prevent slowing down the system. However, because this project was a sentiment analysis the lack of clarity in the images gave the CNN less to define in terms of details like facial expression.

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